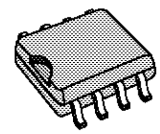
SGS-THOMSON
MICROELECTRONICS

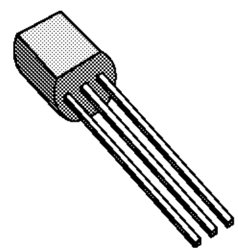
LM217L
LM317L

LOW CURRENT
1.2V TO 37V ADJUSTABLE VOLTAGE REGULATOR

- OUTPUT VOLTAGE RANGE : 1.2 TO 37V
- OUTPUT CURRENT IN EXCESS OF 100 mA
- LINE REGULATION TYP. 0.01%
- LOAD REGULATION TYP. 0.1%
- THERMAL OVERLOAD PROTECTION
- SHORT CIRCUIT PROTECTION
- OUTPUT TRANSISTOR SAFE AREA COMPENSATION
- FLOATING OPERATION FOR HIGH VOLTAGE APPLICATIONS



SO-8



TO-92

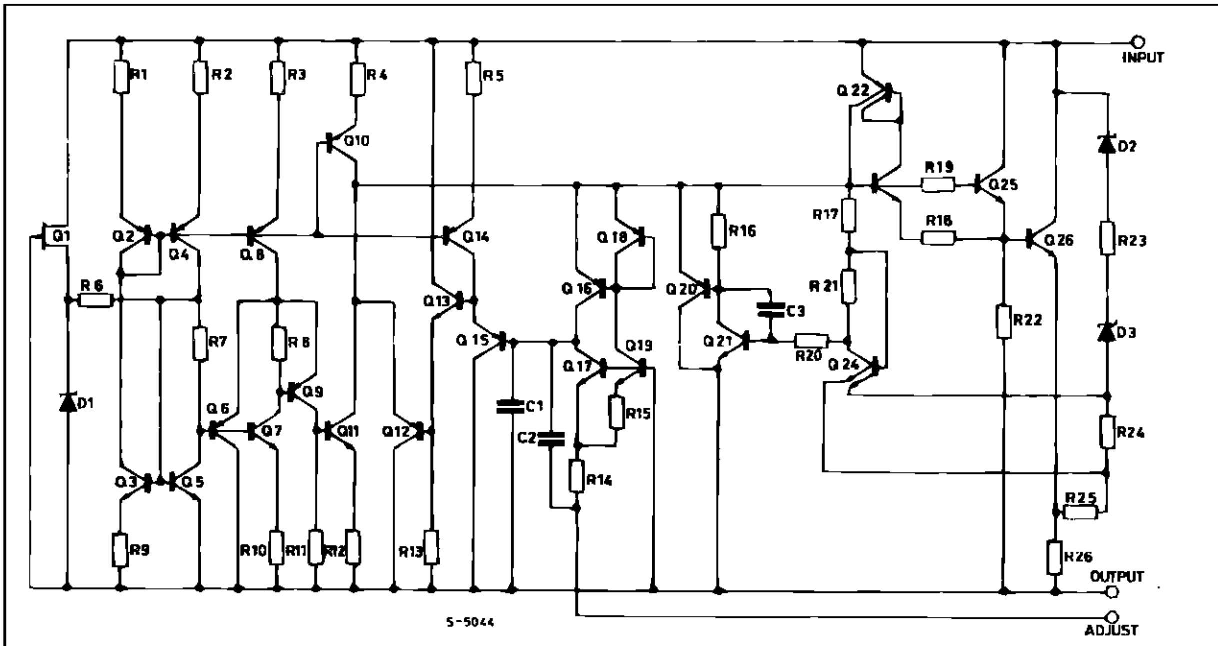
DESCRIPTION

The LM217L/LM317L are monolithic integrated circuit in SO-8 and TO-92 packages intended for use as positive adjustable voltage regulators.

They are designed to supply until 100 mA of load current with an output voltage adjustable over a 1.2 to 37V range.

The nominal output voltage is selected by means of only a resistive divider, making the device exceptionally easy to use and eliminating the stocking of many fixed regulators.

SCHEMATIC DIAGRAM

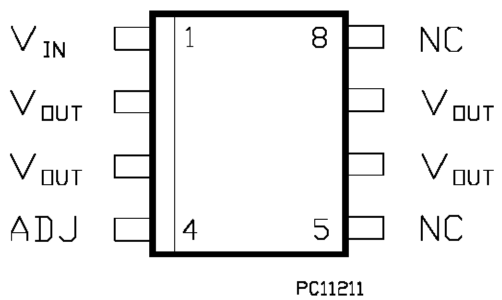


ABSOLUTE MAXIMUM RATING

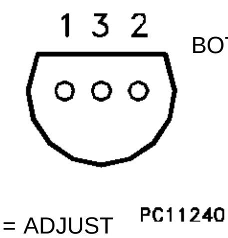
Symbol	Parameter		Value	Unit
V_i - V_o	Input-Output Differential Voltage		40	V
P_d	Power Dissipation		Internally Limited	
T_{opr}	Operating Junction Temperature Range	for **LM217L** for **LM317L**	-40 to 125 0 to 125	^oC ^oC
T_{stg}	Storage Temperature Range		-55 to 150	^oC

PIN CONNECTION AND ORDERING NUMBER

SO-8



TO-92

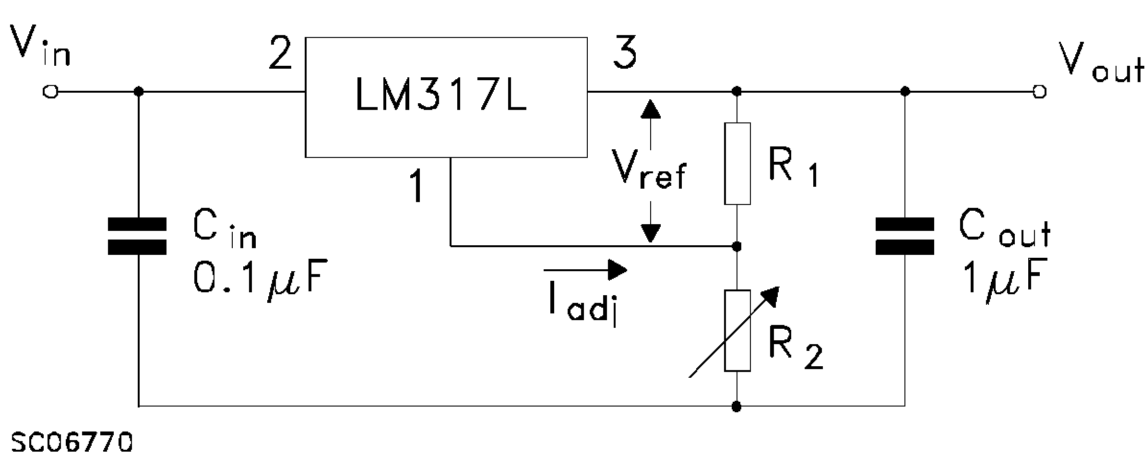


BOTTOM VIEW

pin 1 = ADJUST
pin 2 = IN
pin 3 = OUT

Type	SO-8	TO-92
LM217L	LM217LD	LM217LZ
LM317L	LM317LD	LM317LZ

TEST CIRCUIT



ELECTRICAL CHARACTERISTICS FOR LM217L (Refer to the test circuits, $-40 \leq T_j \leq 125\ ^oC$ $V_i - V_o = 5$ V, $I_o = 40$ mA, unless otherwise specified)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
ΔV_o	Line Regulation	$V_i - V_o = 3$ to 40 V $I_L < 20$ mA	$T_j = 25\ ^oC$		0.01	0.02	%/V
					0.02	0.05	%/V
ΔV_o	Load Regulation	$V_o \leq 5V$ $I_o = 5$ mA to 100 mA	$T_j = 25\ ^oC$		5	15	mV
					20	50	mV
		$V_o \geq 5V$ $I_o = 5$ mA to 100 mA	$T_j = 25\ ^oC$		0.1	0.3	%
					0.3	1	%
I_{ADJ}	Adjustment Pin Current				50	100	μA
ΔI_{ADJ}	Adjustment Pin Current	$V_i - V_o = 3$ to 40 V $I_o = 5$ mA to 100 mA $P_d < 625$ mW			0.2	5	μA
V_{REF}	Reference Voltage	$V_i - V_o = 3$ to 40 V $I_o = 5$ mA to 100 mA $P_d < 625$ mW		1.2	1.25	1.3	V
$\frac{\Delta V_o}{V_o}$	Output Voltage Temperature Stability				0.7		%
$I_{o(min)}$	Minimum Load Current	$V_i - V_o = 40$ V			3.5	5	mA
$I_{o(max)}$	Maximum Output Current	$V_i - V_o = 3$ to 13 V $V_i - V_o = 40$ V		100	200 50		mA
e_N	Output Noise Voltage (percentance of V_O)	B = 10Hz to 10KHz $T_j = 25\ ^oC$			0.003		%
SVR	Supply Voltage Rejection (*)	$T_j = 25\ ^oC$ f = 120 Hz	C_{ADJ}=0		65		dB
			C_{ADJ}=10μF	66	80		dB

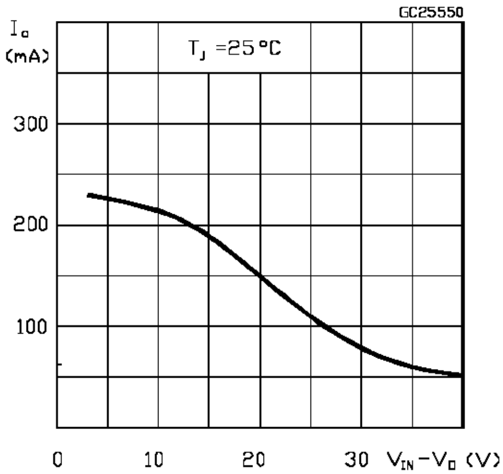
(*) CADJ is connected between Adjust pin and Ground.

ELECTRICAL CHARACTERISTICS FOR LM317L (Refer to the test circuits, $0 \leq T_j \leq 125\ ^oC$ $V_i - V_o = 5$ V, $I_o = 40$ mA, unless otherwise specified)

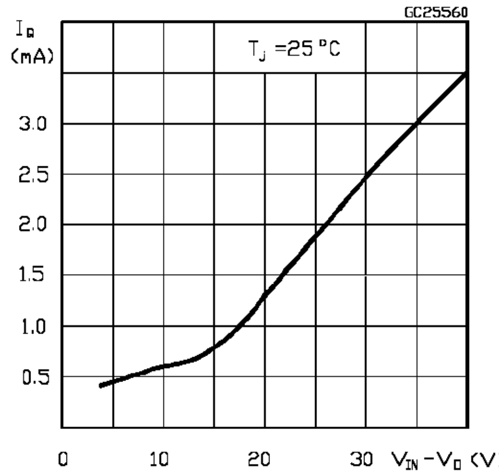
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
ΔV_o	Line Regulation	$V_i - V_o = 3$ to 40 V $I_L < 20$ mA	$T_j = 25\ ^oC$		0.01	0.04	%/V
					0.02	0.07	%/V
ΔV_o	Load Regulation	$V_o \leq 5V$ $I_o = 5$ mA to 100 mA	$T_j = 25\ ^oC$		5	25	mV
					20	70	mV
		$V_o \geq 5V$ $I_o = 5$ mA to 100 mA	$T_j = 25\ ^oC$		0.1	0.5	%
					0.3	1.5	%
I_{ADJ}	Adjustment Pin Current				50	100	μA
ΔI_{ADJ}	Adjustment Pin Current	$V_i - V_o = 3$ to 40 V $I_o = 5$ mA to 100 mA $P_d < 625$ mW			0.2	5	μA
V_{REF}	Reference Voltage	$V_i - V_o = 3$ to 40 V $I_o = 5$ mA to 100 mA $P_d < 625$ mW		1.2	1.25	1.3	V
$\frac{\Delta V_o}{V_o}$	Output Voltage Temperature Stability				0.7		%
$I_{o(min)}$	Minimum Load Current	$V_i - V_o = 40$ V			3.5	5	mA
$I_{o(max)}$	Maximum Output Current	$V_i - V_o = 3$ to 13 V $V_i - V_o = 40$ V		100	200 50		mA
e_N	Output Noise Voltage (percentance of V_O)	B = 10Hz to 10KHz $T_j = 25\ ^oC$			0.003		%
SVR	Supply Voltage Rejection (*)	$T_j = 25\ ^oC$ f = 120 Hz	C_{ADJ}=0		65		dB
			C_{ADJ}=10μF	66	80		dB

(*) CADJ is connected between Adjust pin and Ground.

Current Limit



Minimum Operating Current



APPLICATION INFORMATION

The LM317L provides an internal reference voltage of 1.25V between the output and adjustments terminals. This is used to set a constant current flow across an external resistor divider (see fig. 4), giving an output voltage VO of:

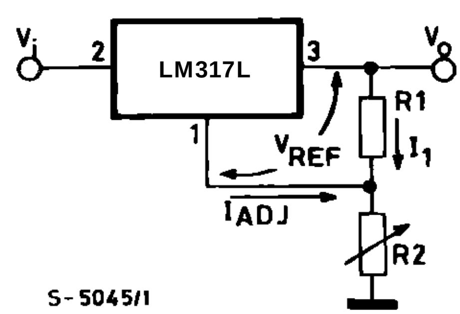
$$V_O = V_{REF} \left(1 + \frac{R_2}{R_1}\right) + I_{ADJ} R_2$$

The device was designed to minimize the term I_{ADJ} (100µA max) and to maintain it very constant with line and load changes. Usually, the error term IADJ·R2 can be neglected. To obtain the previous requirement, all the regulator quiescent current is returned to the output terminal, imposing a minimum load current condition. If the load is insufficient, the output voltage will rise.

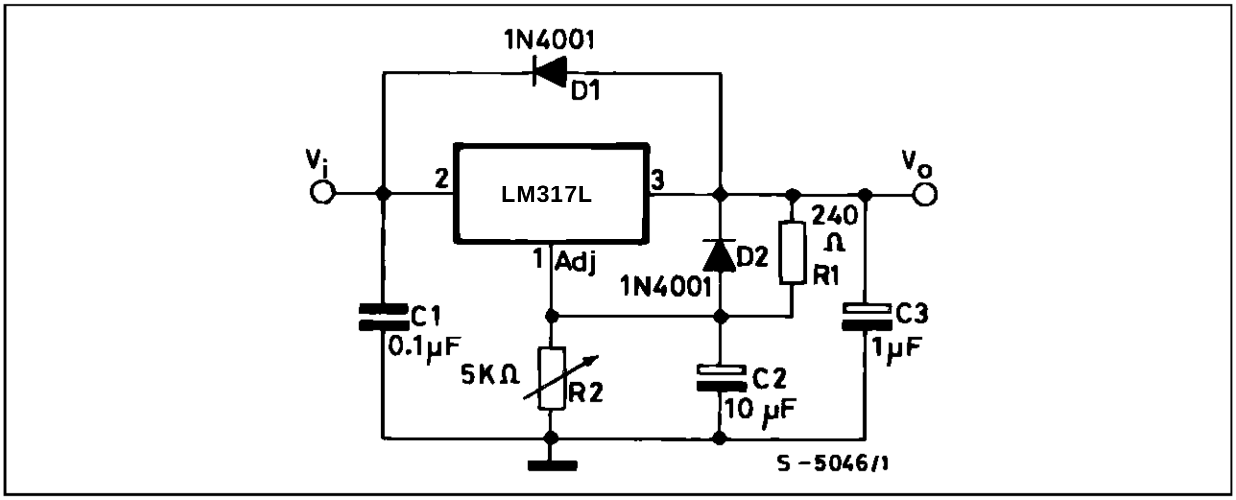
Since the LM317L is a floating regulator and "sees" only the input-to-output differential voltage, supplies of very high voltage with respect to ground can be regulated as long as the maximum input-to-output differential is not exceeded. Furthermore, programmable regulator are easily obtainable and, by connecting a fixed resistor between the adjustment and output, the device can be used as a precision current regulator.

In order to optimise the load regulation, the current set resistor R1 (see fig. 4) should be tied as close as possible to the regulator, while the ground terminal of R2 should be near the ground of the load to provide remote ground sensing.

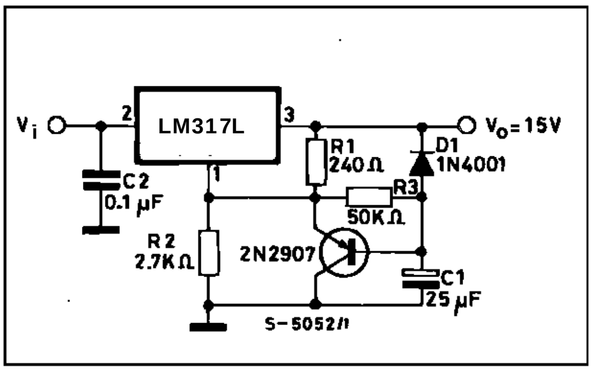
Figure 4 : Basic Adjustable Regulator.



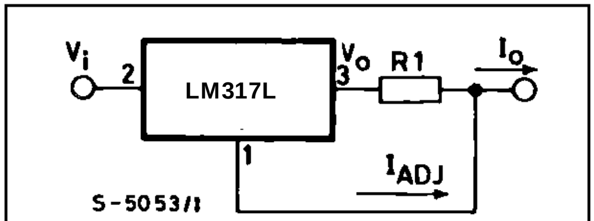
Voltage Regulator with Protection Diodes.



Slow Turn-on 15V Regulator.

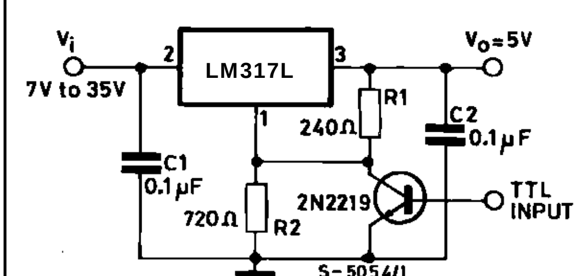


Current Regulator.

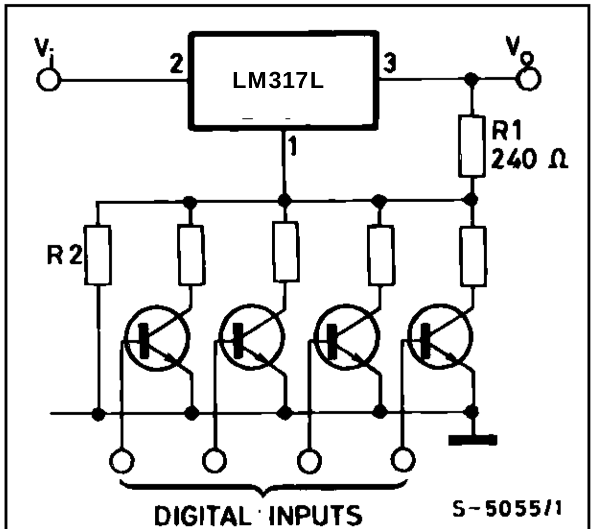


$$I_O = \frac{V_{ref}}{R_1} + I_{ADJ} \approx \frac{1.25V}{R_1}$$

5V Electronic Shut-down Regulator.



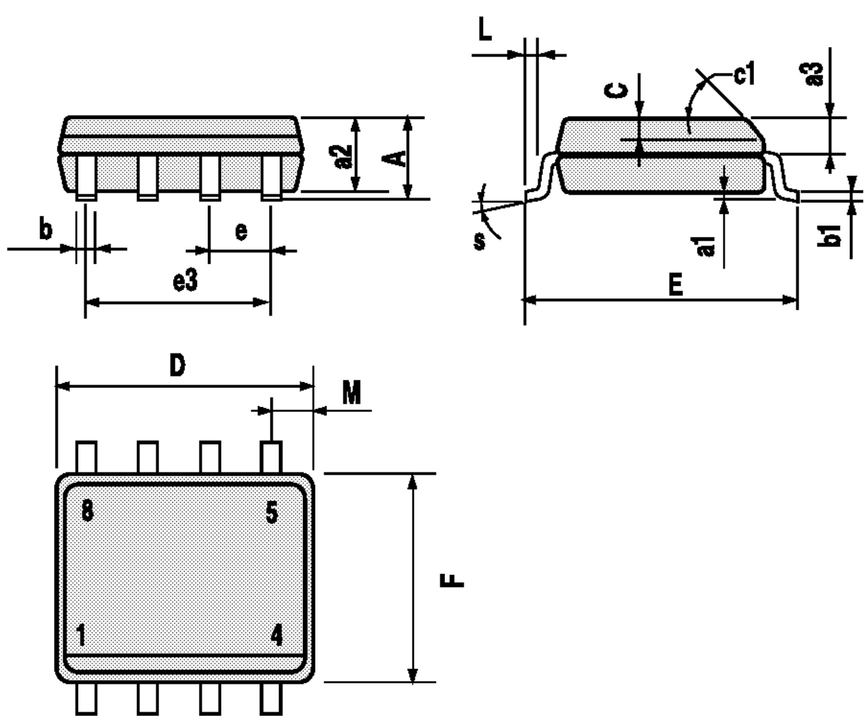
Digitally Selected Outputs.



(R2 sets maximum V_o)

SO8 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.75			0.068
a1	0.1		0.25	0.003		0.009
a2			1.65			0.064
a3	0.65		0.85	0.025		0.033
b	0.35		0.48	0.013		0.018
b1	0.19		0.25	0.007		0.010
C	0.25		0.5	0.010		0.019
c1	45° (typ.)					
D	4.8		5.0	0.188		0.196
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		3.81			0.150	
F	3.8		4.0	0.14		0.157
L	0.4		1.27	0.015		0.050
M			0.6			0.023
S	8° (max.)					



P013M

TO-92 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.58		5.33	0.180		0.210
B	4.45		5.2	0.175		0.204
C	3.2		4.2	0.126		0.165
D	12.7			0.500		
E		1.27			0.050	
F	0.4		0.51	0.016		0.020
G	0.35			0.14		

